Ni-Cu-Co Associated with Mafic and Ultramafic Rocks of Cape Breton Island

Nova Scotia

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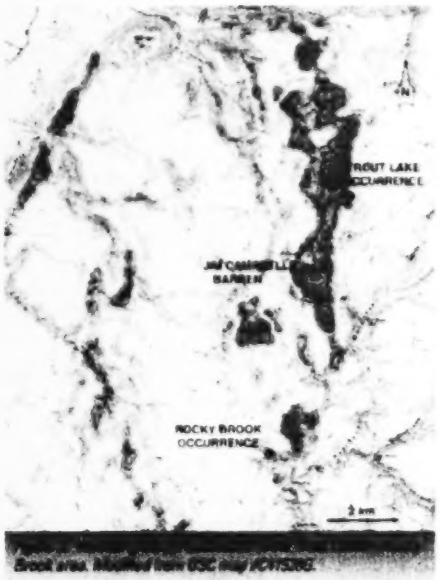
Several vertical gradient 'magnetic' anomalies are apparent on recent airborne vertical gradient maps of the Cape Breton Highlands released by the Geological Survey of Canada. These anomalies are not consistent with recent geological maps of the area, which were published prior to the vertical gradient maps.

Ni-Cu-Co occurrences hosted by mafic to ultramafic intrusions have been documented along three of the magnetic anomalies. In addition, some vertical gradient anomalies can be correlated with anomalous nickel concentrations found in geochemical surveys of stream sediments. Although there has been no focused nickel exploration on these magnetic or geochemical anomalies, preliminary work by the Department of Natural Resources indicates excellent potential for ultramafic Ni-Cu-Co deposits in the Cape Breton Highlands (Fig. 1).

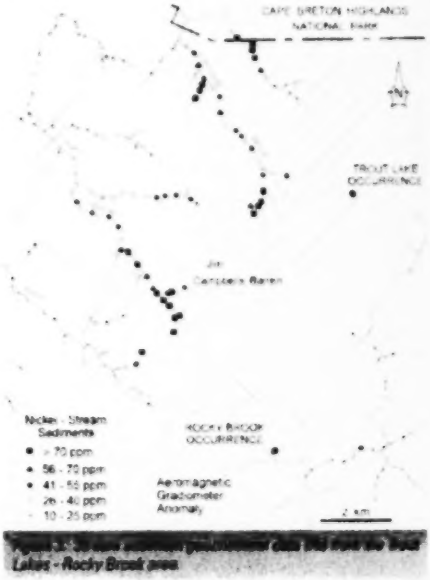
occurrences on Cape Breton Island.

Trout Lakes - Rocky Brook

The most significant vertical gradient anomaly (2.0 nT; Fig. 2) is located in the Trout Lakes - Rocky Brook area. The main body of this north-trending anomaly is approximately 9 km long by 1.5 km wide. Two smaller anomalies are located: (1) a short distance to the south at Rocky Brook, and (2) a short distance to the west at Jim Campbells Barren. These smaller magnetic anomalies may represent fault blocks derived from the mafic to ultramafic intrusion believed to underlie the main anomaly, or they may represent distinct intrusions. An unexplained



Brook area. Modified from GSC map 47-1978.



Lakes - Rocky Brook area.

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net-textured pyrrhotite.

geochemical anomaly (Fig. 3) is associated with the magnetic anomaly.

A pyroxenite sample collected from a trench on the Trout Lakes Ni-Gu-Go occurrence along the eastern side of the main magnetic anomaly returned concentrations of 1163 ppm Ni, 461 ppm Cu and 273 ppm Go. The pyroxenite sample was mineralized with net-textured pyrrhotite (Fig. 4).

A 1956 drilling report for the Rocky Brook occurrence, along the southern extension of the main magnetic anomaly, described drill-hole intersections of pyrrhotite-rich zones in a pyroxenite unit. The mineralized zone was not analyzed for Co or Ni in 1956, but resampling of the core by Tri-Explorations in 1988 revealed concentrations of 0.44% Go and 412 ppm Ni over a 14 ft. section. However, the core box labels were not legible when resampling was carried out in 1988 so it is not known if the Co-rich zone correlates with a pyrrhotite-rich zone described in the 1956 core logs.

Bothan Brook and First Lake O'Law

In 1995, staff of the Nova Scotia Department of Natural Resources collected samples of an olivine-rich ultramafic rock from an outcrop exposed on Bothan Brook, Victoria County. Analysis of these samples showed concentrations of 1420 ppm Ni and 104 ppm Co. The outcrop is located on the southern end of a large airborne vertical gradient anomaly and correlates with a Ni anomaly in stream sediments. A similar, mineralized, olivine-rich ultramafic rock exposed along a brook flowing into First lake O'Law returned levels of 100 ppm Co, 748 ppm Cr, 126 ppm Cu and 416 ppm Ni.

Middle River

Massive pyrrhotite lenses developed along the footwall of a mafic dyke were encountered in the former gold mine workings at Middle River, Victoria County. Analysis of samples from these lenses showed concentrations as high as 2.1% Cu and 2.3% Ni. Platinum nuggets were also reported to have been panned from placer gold workings located downstream from the old gold mine, but this report has never been verified.

Krumrine Quarry

Grab samples of mineralized gabbro collected over a width of 35 m across the face of the Krumrine Quarry returned average concentrations of 4242 ppm Cu and 2153 ppm Ni. Drill core samples from this mineralized zone had average concentrations of 4506 ppm Cu and 3880 ppm Ni over 5.4 m.

Summary

The coincidence of mafic and ultramafic rocks with vertical gradient anomalies, coupled with the presence of Ni-Cu-Co occurrences and/or stream sediment anomalies, indicates strong mineral potential in the Cape Breton Highlands. To date, this area has received only cursory exploration for Ni-Cu-Co deposits.

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